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Mare Island, Vallejo, California

2 August 1948

To: Medical Officer in Command

Subj: Monthly Report of the Experimental Work of the Artificial Limb Department

Ref: (a) Advisory Committee on Artificial Limbs ltr dtd 21 June 1948.

July

1. Monthly report required by reference (a) is hereby submitted.

2. The job application for the engineer has been returned from the Bureau of Medicine & Surgery approved and has been submitted to the Regional Civil Service Commission for placement.

3. Commander Canty attended the First Inter-American Conference on the Rehabilitation of the Crippled and Disabled at Mexico City, July 18-24 1948. Papers on the Suction Socket for Above Knee Prosthesis and Rehabilitation of the Amputee were presented. Information gained at the conference revealed that there is little or no research being done on artificial limbs or facilities for furnishing prostheses; throughout the Central or South American Countries. The delegates to the conference were greatly interested in the work being done in the United States. One of the resolutions approved by the conference was to sponsor the training of technicians and setting up artificial limb shops in order to provide prostheses for the handicapped.

4. The following projects are under production, experimentation and further study:

(a) Lower Extremities Section

1. Foot and ankle

Ten ankle joints of the new design utilizing a single block rubber bumper are being fitted on amputees. The unit which was submitted to the University of California for accelerated testing failed at the attachment of the belt to the cross bar. This has been corrected by utilizing a heavier cross bar containing more threads and utilizing a larger bolt. This unit has been returned to the University of California for continuation of the testing. The second unit utilizing a metal ankle block also failed because the cup holding the rubber bumper was not welded sufficiently to the metal plate. This unit is being rebuilt with the necessary corrections. The third unit is being designed utilizing a single cable for attachment of the foot to the shin and replacing the Adel bearing.

II. Shank

The plastic shank is holding up satisfactorily and it is contemplated using fibre glass laminate instead of fortisan. The PVA bag is now being used

routinely on all the shanks.

III. Knee

A. Mechanical

Mechanical above knee 75St joints are working satisfactorily and are being routinely manufactured. The mechanical below knee 75St joints are being used routinely and are wearing satisfactorily. The functional above knee joint is undergoing testing on an amputee.

B. Hydraulic

No work is being done on a hydraulic AK knee joint except in conjunction with the tilting table.

IV. Cosmetic Problem

A below knee leg is being constructed utilizing a soft plastic socket and a plastic shin with a sponge rubber covering and a latex skin. It is expected that this covering will give both the appearance, softness, and contour of flesh.

V. Brief Summary of status of models as a unit.

The Symes prosthesis utilizing a functional ankle, a plastic shin and soft socket is in standard production with satisfactory results in field testing.

A below knee unit utilizing a functional ankle, plastic shin, soft socket, aluminum joints is in standard production with satisfactory results in field testing.

The taking of below knee stump impressions in a sitting, standing, position appears to give improvement in the fit of the socket. This is readily seen by comparing impressions of the same stump with both methods. When a patient's stump is flexed as in walking or sitting, tissues over the weight bearing points change in their confirmation and shape.

An impression was secured from an amputee using an adjustable below knee prosthesis and Zelox for the impression material. This impression was unsatisfactory because the Zelox set up too quickly while the amputee was walking and sitting. A material is needed which has more body and which sets up slowly in a period of about five minutes. Various other materials are being investigated.

Below knee suction socket prostheses are being fitted with satisfactory results utilizing a soft sponge ring in the socket in order to maintain an air seal. In a female, the problem of the valve appearing in the shin is undesirable from a cosmetic standpoint. A new valve is being designed which can be released by pushing instead of pulling. This valve is readily concealed under the cosmetic sponge covering with its latex skin. No stump sock is used to pull the stump into the socket.

The above knee suction socket prostheses are in standard production. The small valve with a modified flange is being installed and is proving to be satisfactory.

The hydraulic tilting table prosthesis has been redesigned and simplified and parts are being machines.

(b) Upper Extremities Section

I. Arms

The Robin-Aid wrist flexion unit has been redesigned allowing 40° flexion. This unit gives multiple position of the hook in both flexion and extension and appears to be an improvement over other types.

The cineplastic below elbow arm is being fitted to an amputee utilizing the motors for control of the hand lock.

No new cases have been fitted with the above elbow pronator-supinator unit. The Robin-Aid above elbow unit which utilizes an elbow lock is being fitted on an amputee.

II. Hands, hooks, and tools.

Five Robinson hands of the latest design have been fitted on amputees and are proving more satisfactory than the older models.

Work is continuing in the methods of procuring impressions in order to cut down the steps necessary to make the permanent one piece mold for the cosmetic glove.

III. Cosmetic Problem;

The same methods that are utilized in the leg are being studied for application to the arm. All controls will be internal and the covering will be of soft sponge rubber with a latex skin.

IV. Harness and/or other outside control.

The nylon webbing being used in standard production is far superior to the cotton webbing. The buckle for the attachment of the harness to the cable has been redesigned to allow a swivel at the cable post.

V. Brief Summary of status of models as a unit.

Bilateral wrist disarticulations have been fitted with a suction socket in which no air space is permitted at the end of the socket. A hole placed at the end of the socket can be opened and closed by a slide cover. No valve per se is used but the slight vacuum created on closure of the hole is sufficient to help retain the stump in the socket. On bilaterals, wrist flexion units and pronation and supination are essential. If stumps have not sufficient pronation and supination, a mechanical unit is necessary.

Below Elbow arms utilizing plastic shells with soft sockets, functional elbow joints, open cuffs, nylon harness are in standard production and working satisfactorily in field testing. These units allow the amputee to use his own pronation supination when it is available.

Above elbow stumps are being fitted with soft sockets including suction with standard Navy-Fitch arms.

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